

REMARKS

Claims 1-28 are pending. Claims 1 and 10 have been amended, and claims 19-28 have been withdrawn from consideration. No new matter has been added by the amendments.

I. Claim Amendments

Claims 1 and 10 are amended. The language, "a mol ratio of Al (Aluminum) to B (Boron) in the AlN-BN being at least 70%" has been added to both Claims 1 and 10 after "AlN-BN". No new matter has been added by this amendment, as this element is disclosed in the present application on page 22, lines 14-15.

Claim 10 has been amended. The words "and/or" have replaced with the word "and." No new matter has been added by this amendment, as this limitation is already incorporated in Claim 1.

II. Claim Rejections Under 35 U.S.C. § 103 of independent Claim 1.

Claims 1 stands rejected under 35 U.S.C. §103(a) as allegedly being obvious over Ison (WO 01/60627 A2) in view of Yokono et al. (US 5,133,403).

No "and" limitation is taught or suggested by the combination of Ison and Yokono et al.

Claim 1 specifically claims that "*at least a part of the top wall and the bottom wall is made of AlN-BN,*" (*emphasis added*). The undersigned has carefully read Ison in a "line-by-line" fashion and nowhere does the combination of Ison and Yokono et al. disclose both of these claimed limitations of Claim 1, i.e. "and."

Ison only refers to the "cover" as being of a higher thermally conductive material and not the bottom, "*To improve heat transfer from the fluid to the heat sink, the cover is preferably formed from material having a higher thermal conductivity than said base.*" (page 7, lines 29-30), and further "*the cover may be formed from silicon or aluminum nitride, and the base may be formed from piezoelectric material.*" (page 7, line 35-36). Yokono et al. does not teach or suggest a top wall or bottom wall or any construction at all of a printer head.

Therefore the "and" limitation of Claim 1 is not taught or suggested by the cited combination

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of references. For at least this reason, applicants respectfully submit that since all elements of Claim 1 are not disclosed, an obviousness rejection is improper and therefore Claim 1 is allowable.

No teaching of AlN-BN as having higher thermal conductivity than AlN alone.

The Examiner respectfully cites Yokono et al. as supplying the motivation for using AlN-BN over AlN alone from (column 6, lines 1-5) *"to reduce the thermal resistance to a great extent as compared with a composite material of AlN."* Applicants respectfully submit that the data from Yokono et al. and the concluding statement above are erroneous in that the thermal resistance is actually lower for AlN alone than it is for AlN-BN (conversely the thermal conductivity is actually higher for AlN alone than it is for AlN-BN, as thermal conductivity as opposed to thermal resistance is cited in the specification and is readily available). This relationship can be shown by comparing the four values of thermal conductivity cited in the present application, for commercially available AlN-BN, of 90, 90, 19.5 and 7.8 W/mK for AlN-BN (page 23, line 15 to page 24, line 2) to, for example, the AlN produced by Tokuyama Corp, which has a thermal conductivity (at 20 °C) of 184 W/mK as described in ATTACHMENT 1 (homepage of Tokuyama Corp). Consequently, one of ordinary skill in the art would not have been motivated to modify the teachings of Ison by using the AlN-BN material of Yokono et al. because their desire to have the highest thermal conductivity material would have directed them to use AlN and not AlN-BN. Without the motivation to combine, the rejection for obviousness is improper and applicants respectfully submit that Claim 1 is allowable.

Other reasons supporting the use of AlN-BN supplied by the applicants.

(1) Thermal conductivity of the cover plate (top wall or bottom wall) is preferably higher than that of piezoelectric elements by 50w/mK (see page 21, line 1-12 of the present specification).

(2) Linear expansion coefficient of the cover plate should be similar in value to that of the piezoelectric elements (see page 22, line 20 – page 23, line 14 of the present

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specification).

(3) Machinability of the cover plate material should be a high priority. This is a particularly important factor for effectively manufacturing the high quality inkjet recording head (see page 5, 3rd line from the bottom – page 6, bottom line of the present specification).

Applicants respectfully submit that for the aforementioned reasons, AlN-BN is the preferred material for at least a part of the top wall and the bottom wall of the head, and this would not be concluded by merely considering the thermal resistance of the material. Consequently, Claim 1 as Amended is not obvious.

III. Claim Rejections Under 35 U.S.C. § 103 of independent Claim 10.

Claim 10 stands rejected under 35 U.S.C. § 103(a) as allegedly being obvious over Ison (WO 01/60627 A2) in view of Yokono et al. (US 5,133,403). The Examiner has respectfully cited the same references and used the same reasoning in rejecting Claim 10 as for rejecting Claim 1. Therefore, with the amendments to Claim 10, specifically changing “and/or” to “and,” the same arguments made for why Claim 1 is now allowable also hold for why Claim 10 is allowable.

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IV. Conclusion.

It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the Claims herein should now be allowable. Accordingly, reconsideration and allowance are requested.

If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130.

Please telephone the undersigned for any reason, applicants respectfully seek to cooperate with the Examiner.

Respectfully submitted,

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